An Internship in Cryogenic Propulsion

Corey J. Tucker NE-F6, NE-M5, NE-XP

Corey J. Tucker

University of South Florida

B.S. Mechanical Engineering

Expected Graduation: 05/2019

KSC Pathways Intern

Branch: NE-XP

Mentor: Edward Thompson

Prior Experience:

+8 years military experience, Quality Intern: manufacturing of turbine blades, Systems Engineering Intern: waste water treatment facilities

NE-XP

NASA Engineering - Exploration Systems and Operations Division, Cryogenic Propulsion Systems Branch

Responsible for providing engineering expertise to the design, development, test and checkout of cryogenic propellant Ground Support Equipment (GSE) and the processing of flight propulsion systems of the Space Launch System (SLS) Core Stage Main Propulsion System (MPS) [with RS-25 Main Engines] and SLS Upper Stage Main Propulsion Systems [with RL-10 engines].

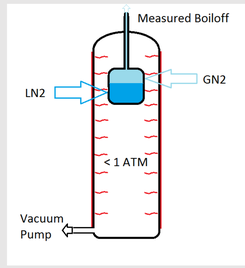
Program:

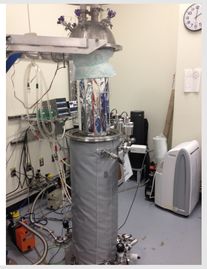
Exploration Ground Systems (EGS)

Develop and operate the systems and facilities necessary to process and launch rockets and spacecraft during assembly, transport and launch.

Summer 2013

Calorimetry Testing: Learn the capabilities of the cryogenics lab, primarily, calorimetry testing. KSC provides testing for private costumers in order to understand the performance of different insulation systems in a vacuum. Testing is done with liquid nitrogen in a container, wrapped with an insulation system with heat applied to the outside.





Spring 2014

GODU-LH2 (Ground Operations Demonstration Unit for LH2): Assist with thermocouple distribution throughout LH2 storage tank. Assist as necessary for flow of work (review system schematics, inventory parts, assist with installation of cryogenic piping)

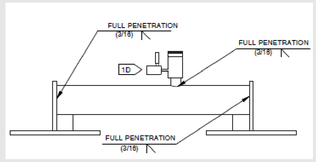
Summer 2014

GPIM (Green Propellant Infusion Mission): Handle AFM-315E green propellant, troubleshoot hardware failures for fatigue crack testing, assist with procedure writing, sit in on NRHOWG review meetings and facilitate corrections.

Break for Military Service

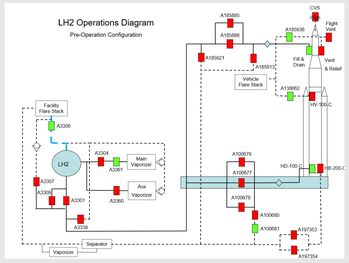
Summer 2017

Vacuum Seal-Off Valve test: Created Qualification Test Plan to compare different valves' performance during an SLS launch. Design test fixture to test each valve. Present plan and fixture to Chief Engineer for review. Integrated red line revisions to Plant habitat drawing.



Summer 2018

Integrate into the daily workload of NE-XP: The focus of this rotation is in anticipation of it being my final rotation. Assist in processing GSE for SLS. Created LH2 operations diagram. Assist with integration of purge sampling on mobile launcher.



For the Future

Graduation 05/2019

Submit for Conversion

Skills Gained

- Application of Fluid Dynamics
- Hands on experience with Cryo systems
  NEO, Mobile Launcher, Cryo Lab
- Reading fluid schematics
- Creating Engineering drawings
- Geometric dimensioning and tolerances
- Cryogenic and lab safety
- Pressure Vessel System (PVS)
- Creo Parametrics
- LabVIEW
- Writing test procedures

MISC.

Shuttle Landing Facility/NASA Helicopters

Mobile Launcher

Self Contained Breathing Apparatus training

Robotic Mining Competition 2014